

August 14, 2015



U.S. Department  
of Transportation

East Building, PHH – 30  
1200 New Jersey Avenue, Southeast  
Washington, D.C. 20590

**Pipeline and Hazardous  
Materials Safety Administration**

DOT-SP 16346  
(FIRST REVISION)

|                                |
|--------------------------------|
| EXPIRATION DATE: July 31, 2017 |
|--------------------------------|

(FOR RENEWAL, SEE 49 CFR § 107.109)

1. GRANTEE: FIBA Technologies, Inc.  
Littleton, MA
2. PURPOSE AND LIMITATIONS:
  - a. This special permit authorizes the manufacture, mark, sale and use of a non-DOT specification hoop-wrapped carbon fiber reinforced composite gas cylinder with seamless steel liner that meets the ISO Standard 11515, except as specified herein, for the transportation in commerce of the hazardous materials authorized by this special permit. This special permit provides no relief from the Hazardous Materials Regulations (HMR) other than as specifically stated herein. The most recent revision supersedes all previous revisions.
  - b. The safety analyses performed in development of this special permit only considered the hazards and risks associated with transportation in commerce. The safety analyses did not consider the hazards and risks associated with consumer use, use as a component of a transport vehicle or other device, or other uses not associated with transportation in commerce.
3. REGULATORY SYSTEM AFFECTED: 49 CFR Parts 106, 107 and 171-180.
4. REGULATIONS FROM WHICH EXEMPTED: 49 CFR § 173.301(a)(1) in that compressed gases must be in UN pressure receptacles built in accordance with the UN standards, except as specified herein.

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**NOTE:** This special permit does not relieve the holder from securing an approval for manufacturing cylinders from the Associate Administrator for Hazardous Materials Safety.

5. BASIS: This special permit is based on the application of FIBA Technologies, Inc. dated November 26, 2014, submitted in accordance with § 107.105 and the public proceeding thereon and additional information submitted August 7, 2015.

6. HAZARDOUS MATERIALS (49 CFR § 172.101):

| <b>Hazardous Material Description</b>   |                               |                              |                      |
|---|-------------------------------|------------------------------|----------------------|
| <b>Proper Shipping Name</b>   | <b>Hazard Class/ Division</b> | <b>Identification Number</b> | <b>Packing Group</b> |
| Air, compressed   | 2.2                           | UN1002                       | N/A                  |
| Argon, compressed   | 2.2                           | UN1006                       | N/A                  |
| Compressed gas, n.o.s.  | 2.2                           | UN1956                       | N/A                  |
| Compressed gas, oxidizing, n.o.s.   | 2.2                           | UN3156                       | N/A                  |
| Helium, compressed  | 2.2                           | UN1046                       | N/A                  |
| Hydrogen, compressed  | 2.1                           | UN1049                       | N/A                  |
| Methane, compressed or Natural gas, compressed ( <i>with high methane content</i> ) | 2.1                           | UN1971                       | N/A                  |
| Neon, compressed  | 2.2                           | UN1065                       | N/A                  |
| Nitrogen, compressed  | 2.2                           | UN1066                       | N/A                  |
| Nitrous oxide   | 2.2                           | UN1070                       | N/A                  |
| Oxygen, compressed  | 2.2                           | UN1072                       | N/A                  |

7. SAFETY CONTROL MEASURES:

a. PACKAGING - Packaging prescribed is a non-DOT specification, hoop-wrapped carbon fiber reinforced composite with a load sharing, seamless steel liner, (Type 2) cylinder (tube) as described in FIBA Technologies, Inc.'s

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application on file with the Office of Hazardous Materials Safety Approvals and Permits Division (OHMSAPD). Each tube must meet all the design and construction requirements of ISO Standard 11515 (Gas cylinders - Refillable composite reinforced tubes of water capacity between 450 L and 3,000 L - Design, construction and testing) except as follows:

(1) § 6.2.4 - A certificate of conformance from the fiber and or towpreg manufacturer may be accepted provided FIBA verifies the fiber strength values by performing a minimum of one test for every five batches of tubes.

(2) § 7.3.2 - Liners that have been wrapped and the composite is cured may be entirely removed and be re-wrapped provided that the liner has not been autofrettaged, damaged, scored, or had the mechanical properties changed by the removal process. Re-wrapping of Liners that have been autofrettaged is not authorized.

(3) § 8.1 - The DOT Independent Inspection Agency (IIA) may accept the results of design qualification testing that was conducted and witnessed by another IIA. The IIA must evaluate and confirm that the testing met the requirement of ISO 11515 and this special permit.

(4) § 8.2.4 - The DOT Independent Inspection Agency (IIA) may accept the results of design qualification testing that was conducted and witnessed by another IIA. The IIA must evaluate and confirm that the testing met the requirement of ISO 11515 and this special permit.

(5) §§ 10.1 and 10.2 - Marking must contain the following:

(i) DOT special permit number "SP 16346" followed by working pressure (service pressure) expressed in bar (bar).

(ii) A serial number and the manufacturer's identification number or a symbol as obtained from the Associate Administrator for Hazardous Materials Safety, located just below or immediately following the DOT marking. The serial number and the manufacturer's identification

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number may be placed on the liner provided the markings are accessible for inspection.

(iii) The DOT inspector's official mark must be placed near the serial number. The marking must contain the date (month and year) of the initial hydraulic proof pressure test for that tube.

(iv) The size of the letters and numbers used must be at least 0.64 cm (1/4 inch) high if space permits. The following are examples of an authorized format for marking:

- DOT-SP AAAAA-YYYY

(where AAAAA is the special permit number and YYYY is the service pressure in bar)

- CCCC MMI

(where CCCC is the serial number and MMI is the manufacturer's mark or symbol)

- DDD - MM/YY

(where DDD is the inspector's mark and MM/YY is the month and year of the hydraulic proof pressure test)

(v) Additional markings are permitted, provided the additional markings do not obscure the required markings and are not detrimental to the integrity of the tube. Provisions for marking of the required requalification dates and RIN information must be made near the tube markings.

b. Pressure relief devices must be in accordance with CGA S-1.1, except that burst discs may be set at design test pressure of the tube (ph) with a tolerance of plus zero (0) to minus 15%.

c. REQUALIFICATION -

(1) Each tube must be requalified once every 5 years by a qualified person holding a valid DOT RIN using a hydraulic proof pressure test equal to 1.5 times the marked service pressure and the pressure must be held for a minimum of 2 minutes without a loss of pressure.

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Each tube must visually be inspected in accordance with CGA Pamphlet C-6.2, Guidelines for Visual Inspection and Re-qualification of Fiber Reinforced High Pressure Cylinders, except as specifically noted herein:

(i) Tubes with fiber damage (cuts, abrasions, etc.) that exceeds Level 1 type damage as defined in CGA Pamphlet C-6.2 and meet the following depth and length criteria are considered to have Level 2 damage:

(A) Depth - Damage that upon visual inspection is seen to penetrate the outer hoop carbon layer but does not expose the helical carbon layer beneath, or that has a measured depth of greater than 0.005 inch and less than 0.045 inch.

(B) Direction and length of damage -

| Region        | Direction of fiber damage                              | Maximum length of damage                    |
|---------------|--|---|
| Tube sidewall | Transverse to fiber direction (longitudinal direction) | 10% of the straight sidewall section length |
| Tube sidewall | In fiber direction (circumferential direction)         | 10% of the straight sidewall section length |

(ii) Tubes with damage that meet the Level 2 criteria must be rejected. Requalifiers must contact the tube manufacturer in the event that the damage cannot be clearly interpreted based on these criteria. Repair of rejected tubes is authorized for Level 2 type damage. Repairs must be made in accordance with CGA Pamphlet C-6.2, prior to the hydrostatic pressure test. Repairs must be evaluated after the hydrostatic test.

(iii) Tubes that have direct fiber damage that penetrates through the outer hoop carbon layer and into the helical carbon layer, or that have a measured damage depth of greater than the Level 2 maximum are considered to have Level 3 type

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damage. Tubes that have damage with depth meeting Level 2, but length that exceeds the Level 2 maximum, are considered to have Level 3 type damage. Tubes with Level 3 type damage are not authorized to be repaired, and must be condemned.

(iv) A nondestructive examination (NDE) which is approved by the OHMSAPD. The approved NDE may be used in lieu of internal visual inspection and hydraulic proof pressure test.

(2) A hydrostatic requalification may be repeated as provided in § 180.205(g); only two such tests are permitted. Pressurization prior to the official hydrostatic test for the purpose of a systems check may not exceed 85% of the minimum required test pressure.

(3) Persons who perform inspection and testing of tubes subject to this special permit must comply with § 180.205(b) and with all the terms and conditions of this special permit.

(4) Requalification date (month/year) must be permanently marked on the tube as specified in paragraph § 180.213. The marking of the RIN symbol on the tube certifies compliance with all of the terms and conditions of this special permit.

d. OPERATIONAL CONTROLS -

(1) Tubes manufactured under this special permit are not authorized for use 15 years from the date of manufacture, except as specified under paragraph 8.a. of this special permit.

(2) The liner materials of tubes manufactured under this special permit must meet ISO Standard 11114-1 (Transportable gas cylinders – Compatibility of cylinder and valve materials with gas contents – Part 1: Metallic materials) for all gases listed herein.

(3) Pressure cycling test for each batch of tubes manufactured under this special permit must be 15,000 cycles using design test pressure ( $P_h$ ), as described in § 8.5.5 of ISO 11515.

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(4) Tubes manufactured under this special permit are limited to a maximum service (working) pressure of 3,600 psig. In order to request an increase in the maximum service (working) pressure FIBA must submit an application to OHMSAPD which must include design qualification testing data as described in ISO 11515.

(5) When tubes are horizontally mounted on a motor vehicle or in an ISO framework or other framework of equivalent structural integrity, the following requirements shall be met:

(i) All requirements of § 173.301(i);

(ii) The frame design must meet all requirements of CGA TB-25.

(6) Tube handling - tube must be rejected if it drops from a height greater than 2' during the manufacturing and/or prior to being mounted to the CSC framing;

(7) When a tube assembly is equipped with a cabinet, the Cabinet Flammability Limit - Lower Level Flammability Limit (LEL) of each gas or gas mixtures must be calculated for the highest pressure and temperature and to ensure the cabinet of the tube assembly is equipped with proper ventilation to avoid a fire or explosion during transportation;

(8) A tube that has been subjected to fire may not be returned to service.

8. SPECIAL PROVISIONS:

a. Service Life Extension Program.

(1) Tubes manufactured under this special permit are authorized for a maximum service use of 15 years from the date of manufacture unless the manufacturer submits a service life extension program within 12 months of the issuance of this special permit. If FIBA Technologies, Inc.'s life extension program is accepted by the OHMSAPD and acknowledged in writing, then the program must be implemented for each design type prior to extending tube service life from 15 years to determine additional years of service life. The maximum service under this special permit is 30 years from the date of manufacture.

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(2) Under the service life extension program, FIBA Technologies, Inc. must randomly recall a minimum of thirty tubes of each design type which have been in service for 10 and 13 years. Tubes recalled after 10 years shall be designated "Group A" and tubes recalled after 13 years shall be designated "Group B". All recalled tubes must be subjected to design requalification as specified Sections 8.5.4, and 8.5.6 of ISO 11515. Acceptance criteria shall be as defined in ISO 11515 the design life (y) must be greater than or equal to 20 years. All tubes that fail to meet the requalification requirements must be condemned, removed from service and rendered incapable of retaining pressure. In the case that units from the initial minimum lot size are condemned, an additional 30 tubes must be selected and subjected to the same design requalification as specified above. An Independent Inspection Agency must witness all testing.

(3) The complete test report including original test data must be submitted to the Associate Administrator for Hazardous Materials Safety for assessment within 30 days of completion. Failure to meet the acceptance criteria specified in this section shall result in the design being restricted to a maximum life of 15 years.

b. In accordance with the provisions of Paragraph (b) of § 173.22a, persons may use the packaging authorized by this special permit for the transportation of the hazardous materials specified in paragraph 6, only in conformance with the terms of this special permit.

c. A person who is not a holder of this special permit, but receives a package covered by this special permit, may reoffer it for transportation provided no modification or change is made to the package and it is offered for transportation in conformance with this special permit and the HMR.

d. A current copy of this special permit must be maintained at each facility where the package is offered or reoffered for transportation.

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- e. Each packaging manufactured under the authority of this special permit must be either (1) marked with the name of the manufacturer and location (city and state) of the facility at which it is manufactured or (2) marked with a registration symbol designated by the Office of Hazardous Materials Special Permits and Approvals for a specific manufacturing facility.
- f. A current copy of this special permit must be maintained at each facility where the packaging is manufactured under this special permit. It must be made available to a DOT representative upon request.
9. MODES OF TRANSPORTATION AUTHORIZED: Motor vehicle, rail freight, and cargo vessel.
10. MODAL REQUIREMENTS: A current copy of this special permit must be carried aboard each cargo vessel or motor vehicle used to transport packages covered by this special permit.
11. COMPLIANCE: Failure by a person to comply with any of the following may result in suspension or revocation of this special permit and penalties prescribed by the Federal hazardous materials transportation law, 49 U.S.C. 5101 et seq:
- o All terms and conditions prescribed in this special permit and the Hazardous Materials Regulations, 49 CFR Parts 171-180.
  - o Persons operating under the terms of this special permit must comply with the security plan requirement in Subpart I of Part 172 of the HMR, when applicable.
  - o Registration required by § 107.601 et seq., when applicable.

Each "Hazmat employee", as defined in § 171.8, who performs a function subject to this special permit must receive training on the requirements and conditions of this special permit in addition to the training required by §§ 172.700 through 172.704.

No person may use or apply this special permit, including display of its number, when this special permit has expired or is otherwise no longer in effect.

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Under Title VII of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU)—"The Hazardous Materials Safety and Security Reauthorization Act of 2005" (Pub. L. 109-59), 119 Stat. 1144 (August 10, 2005), amended the Federal hazardous materials transportation law by changing the term "exemption" to "special permit" and authorizes a special permit to be granted up to two years for new special permits and up to four years for renewals.

12. REPORTING REQUIREMENTS: Shipments or operations conducted under this special permit are subject to the Hazardous Materials Incident Reporting requirements specified in 49 CFR §§ 171.15 - Immediate notice of certain hazardous materials incidents, and 171.16 - Detailed hazardous materials incident reports. In addition, the grantee(s) of this special permit must notify the Associate Administrator for Hazardous Materials Safety, in writing, of any incident involving a package, shipment or operation conducted under terms of this special permit.

Issued in Washington, D.C.:



for Dr. Magdy El-Sibaie  
Associate Administrator for Hazardous Materials Safety

Address all inquiries to: Associate Administrator for Hazardous Materials Safety, Pipeline and Hazardous Material Safety Administration, U.S. Department of Transportation, East Building PHH-30, 1200 New Jersey Avenue, Southeast, Washington, D.C. 20590.

Copies of this special permit may be obtained by accessing the Hazardous Materials Safety Homepage at [http://hazmat.dot.gov/sp\\_app/special\\_permits/spec\\_perm\\_index.htm](http://hazmat.dot.gov/sp_app/special_permits/spec_perm_index.htm) Photo reproductions and legible reductions of this special permit are permitted. Any alteration of this special permit is prohibited.

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